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ABSTRACT

It is proposed that a speech-dynamic analysis of oral fluency phenomena serves best to highlight the nondiscrete nature of the sound stream and to capture English syllable structure. Some current concepts and practices in oral testing are criticized, and previously neglected evidence concerning temporal variables in speech, automatic speech recognition, and recent experimental findings are presented that support a reexamination of the parameters of fluent speech based on quantitative and qualitative phenomena. The quantitative and qualitative speech parameters are outlined and discussed to underscore the range and complexity of features that nonnative speakers must master for fluency. Native and nonnative speech data on consonant attraction are examined, and the phenomenon of restoration in listening is also briefly discussed. It is concluded that with a topic as multidimensional as fluency, at least some of the features sensitive to speech flow and information flow in language have inevitably received insufficient attention. A more holistic understanding of these features can, along with innovative techniques, contribute to improved attainment of fluency. (MSE)

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Oral Fluency and Its Evaluation*

Adolf E. Hieke

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Abstract

Despite its prominent role in second language learning, oral fluency is not yet fully understood nor has it been adequately assessed. The concept of fluency as a holistic phenomenon must be questioned and reviewed in light of research in adjoining disciplines. Recognizing a more differentiated approach based on quantitative and qualitative parameters can lead to an improved understanding of the characteristics of fluent speech and correct misconceptions, particularly in the area of fluency testing. How such an orientation would affect the evaluation of oral fluency is shown for two parameters, speech rate and consonant attraction, and supported by data on differences between native and nonnative English. For the investigation of oral fluency phenomena, a speech-dynamic analysis serves best to highlight the nondiscrete nature of the sound stream and to capture English syllable structure. This approach permits an alternate view which may in turn contribute to the learning, teaching, and testing of oral fluency.

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1. Introduction

A considerable proportion of language learning and teaching is currently carried out in the oral mode. This approach conserves time and highlights fluency as one of the ultimate objectives of most second language programs. That there are mild to massive failures in the attainment of fluency, at least in the usual teaching programs, is common knowledge. What is so disturbing is the lack of common agreement as to the exact nature of fluency, and that there exists no body of knowledge making its components in extemporaneous speech explicit (cf. Crystal 1971; Leeson 1975); treatment of the concept relies entirely on rather shallow empirical grounds. Far too little stress is being put on the exploration of fluency from a performative viewpoint--language is a primarily oral phenomenon, after all--and on the teaching of fluency as a composite of fundamental skills. The brief overview of current testing practices below reveals woeful inadequacies (for a thorough survey see Stevenson 1983; cf. also Bell 1981), and more specifically, how fluency continues to be evaluated holistically and subjectively, and hence with variant interpretations of a learner's competence as a matter of course. Not even the resources of the Foreign Service Institute (FSI) with its highly rated Oral Interview Test compensates for this undesirable state of affairs. The FSI test remains a subjective instrument and prohibitively expensive to administer as part of any standard program.

Fluency continues to be an evasive concept. The literature,

to no one's surprise, is replete with vacuous definitions, overlapping terminology, and unrealistic assessment strategies. All of this is further complicated by a rather unhelpful view of what constitutes speech, transcription systems being loaded with the bias of preanalysis instead of speech as actual speech. The following takes issue with some concepts and practices and presents previously neglected evidence from temporal variables in speech, from Automatic Speech Recognition (ASR) research, and from recent experimental findings. It proposes a fresh look at the parameters of fluent speech based on quantitative and qualitative phenomena and suggests specific parameters as representative for the class as a whole. This is facilitated, on the one hand, through innovative instrumentation now available, and on the other by adopting a speech-dynamic approach (akin to articulatory dynamics) which more accurately reflects the realities of fluent speech.

Regrettably, mainstream linguistics has tended to neglect the oral aspect of language--despite lip-service to the contrary--and that has set fluency studies back. Because of a "lack of interest in the dynamics of speech production and of the important variable of timing in speech" (MacNeilage and Ladefoged 1976:110), the record of speech as transcribed no longer reliably contains the aurally captured, unadulterated sound stream in real-time display. More typically, it appears in the form of a preanalyzed version with words and syllables essentially in citation form (cf. Brown 1977). Such an approach hides the vast alterations which conventional forms undergo due to the exigen-

cies of speech production and the principle of least-effort. The variety of articulatory adjustments dictated by respective phonetic environment, speed of delivery, formality of register, and similar pragmatic considerations can ultimately be traced back to such ease-of-effort motivations. Common to all processes which are responsible for the derivation of language as citation form into speech as dynamic reality is what might be called absorption, and this term will be used here to capture the entire catalogue of occurrences as well as to describe classes of related phenomena.

Not too long ago, the evaluation of general fluency was thought to be "fairly easy"; it was the assessment of pronunciation which was considered to be the "really serious problem" (Harris 1969:832). The attitude now is different but has not really improved. Some consider fluency "easiest to assess since it focuses only on pauses, back-tracking, and fillers in the speech flow" (Mullen 1977:33); others subsume too much under the term, namely not only "the ability to talk at length with few pauses" and "to talk in coherent, reasoned, and 'semantically dense' sentences...to have appropriate things to say", but also skills people have

to be creative and imaginative in their language use, to express their ideas in novel ways, to pun, to make up jokes, to attend to the sound independently of the sense, to vary styles, to create and build on metaphors, and so on (Fillmore 1979:93).

There are still longer and more inclusive definitions (Leeson 1975:144-46), but none really useful to the classroom

teacher, the practicing linguist--e.g., the following, profess-
edly a useful working definition of fluency: "sustained oral
production implying a certain communicative competence, as well
as the unstilted, spontaneous use of English 'conversational [sic]
lubricants'" (Beardsmore 1974:323). It is clear that such vague
and widely divergent statements, whether from practicing or
theoretical linguists, cannot be translated into workable guide-
lines and reliable classroom procedures for actual fluency assess-
ment. Both groups share the common goal of analyzing language,
of course, with the former investigating language as stream of
speech and the latter attempting to dissect and display it as
strings of discrete elements or features. The latter approach has
dominated and prevented dynamic speech from being focal, a neglect
with consequences for fluency evaluation to this day.

2. Current Fluency Evaluation and Testing

We are far from a good grasp of even the significant factors
which contribute to an impression of fluency. It is unfortunate
that neither teaching nor testing of advanced oral English has
received much serious attention (cf. Perkins 1981), which may
account for the fact that "language proficiency is one of the
most poorly defined concepts in the field of language testing"
(Farnady 1982:44). The definitions used in oral testing instru-
ments bear witness to that, and this is not really surprising when
even the most influential studies have nothing more concrete to
offer in the way of fluency terminology than "reasonable speed;
with sufficient precision; with reasonable correctness (gramma-
tically, lexically, phonologically)" (Van Ek 1976:35). The same

kind of weakness can affect the cogency of experimental studies. In one instance, the evaluation of communicative skills is to be based on: "a) Willingness to communicate, effort made to express oneself; b) How much actual communication took place", with the latter determined according to a six-point scale of "None, little, more left than right, more right than left, considerable, great" (Savignon 1972:88). The shortcomings of definitional foundations such as these are patently obvious. But as a glance at the FSI rating scale makes clear, even the most respected forms of oral testing are in principle no more sophisticated. In the FSI, fluency is evaluated on a six-point scale going from "even" to "uneven" (Adams 1980:1). For thoroughly experienced evaluators, this may in fact work, but to explain to anyone, for instance the student being tested, what exactly either of these terms means at, say, point four on the scale, would surely stymie even them.

A rating scale supposedly avoiding the weaknesses of the FSI is offered by Bartz (1979). Fluency, rather than "absolute speed of delivery", refers to "overall smoothness, continuity, and naturalness...as opposed to pauses for rephrasing sentences, groping for words, and so forth" (1979:19). What might naturalness as opposed to pauses be in how it differs in degree from the native speaker's similarly frequent use of pausing? Bartz's general definition is continued with statements designed to isolate six scalar levels of proficiency from "As effortless and smooth as speech of native speaker [sic]" to "Very many unnatural pauses, very halting and fragmentary delivery" (1979:19). Aside from the vague quantifiers used, what are natural pauses, and

what makes natural pauses natural? How long does a pause have to be to rate as unnatural? What evaluator can reliably differentiate pauses as brief as 125 msec (more on that below), and what are their privileges of occurrence? There can be no answers to such questions without a scientific framework, except in form of the general notions already familiar from the FSI. Yet both scientific integrity and responsibility toward students so tested cry out for answers (cf. Stevenson 1983 on standards and ethics). The following can serve as a summary to methods used in oral tests and their drawbacks:

They are so cumbersome that they are reserved only for end-of-course testing....They are subjective....Many spoken[sic] tests do not require the student actually to speak....Results of partial production tests...correlate poorly with speaking ability....Tests are so limited in scope and so predictable that students can prepare for them without necessarily being able to use the language to do anything further (Ferguson 1978:340).

To this can be added the problems resulting from the testing mechanics: "Low scorer reliability....Isolating and objectively scoring the constituent elements....Establishing relative weights for these elements....Eliciting comparable speech samples" (Perren 1967:22-29). Naturally, the most critical elements are time expenditure, with up to half an hour of two staff members' time taken up in proper administration and scoring per candidate, and also lack of objectivity in scoring. Reschke (1977) describes this situation as follows:

On the basis of experience and intuitive knowledge the tester 'knows' what constitutes an A, B, C, D, or F performance at any level. I have no objection to intuitive judgments per se, but at least in the area of testing we have to be able to substantiate them according to clearly established criteria and, if need be, in writing (1977:104).

Thus there is general consensus to the effect that the oral interview "does not measure up to the qualities demanded of a good test" (Raatz 1981:211), but also that it is not likely to be discarded any time soon (Clark 1975:17). No matter how elegantly the definitions can be stated, they will never be sufficient until the holistic approach as such has been abandoned.

For some time now, short indirect tests (e.g., cloze or reduced redundancy) have been proposed in order to side-step the problems of face-to-face testing (cf. Caulfield and Smith 1981). But testing one skill to assess another, despite encouraging statistical support, leaves uneasy feelings: "The mere existence of a statistical relationship between two types of instruments is generally not a convincing demonstration of the examinee's actual competence in active speech production" (Clark 1979:36). A focus on isolated skills immediately raises additional problems, such as insufficient differentiation of skills (Knibbeler 1980) or insufficient differentiation of errors (Townson 1973). Objections to indirect testing are mounting even where it is proposed merely as a partial measure (Brown 1983), and the general view emerges that:

Using the surrogate measure to assess another skill will sacrifice qualitative information (accuracy of prediction) for quantitative information (efficiency)....It would be better to pursue substitution measures by looking for more efficient speaking tests--preferably a direct test that requires the test-taker actually to perform the skill that is being tested and for which there is a direct relationship between the test procedure and the evaluation to assure high validity (Shohamy 1982:168).

Viable alternatives along the lines suggested above may be possible in yet one more form of testing, namely "those tests which, although eliciting active speech by the examinee, do so by means of tape recordings, printed test booklets, or other 'nonhuman' elicitation procedures" (Clark 1979:36). The use of taping, for example, can significantly enhance cost effectiveness since it permits the simultaneous testing of an entire class. Here the crucial precondition of testing oral competence in an objective manner is also met more successfully. The following discussion is therefore based on such procedures and intended to function within the framework of semidirect testing.

3. Quantitative Parameters of Fluency

It would be impractical, of course, to test all available parameters or even a majority of them. Ideally, a single one, if it is representative, would serve, provided it is suitable for application within the usual, limited resources of classroom

teachers in terms of time, effort, and instrumentation essential for its analysis. The following discussion shows that not all measures lend themselves to testing in any case, nor do all reflect fluency at intermediate proficiency levels equally well. In the literature on temporal variables in speech (cf. Appel, Decherz, and Raupach 1980; O'Connell and Kowal 1983) a number of quantitative parameters have been isolated and defined. For some of them, crosslinguistic comparisons are already available (cf. Hieke 1980).

Paramount among these is speech rate, the amount of speech produced over a period of time, usually measured in syll/sec. As a general norm, Lenneberg (1967) suggested 6 syll/sec $\pm$ 1 as average; for extemporaneous speech, a figure of slightly over 4 syll/sec is more accurate (Hieke 1980). Two variables play a role here, though: speech mode (such as reading aloud, reciting, lecturing, paraphrasing) and type of delivery (such as casual, deliberate, *alleggrissimo*). Speech rate has the advantage of being easily assessed (requiring at most a stopwatch and a hand counter) and differentiates well at intermediate and advanced proficiency levels (fluency in its own right being rarely stressed or formally taught at elementary levels).

Other measures chart length of runs (the average number of syllables occurring between pauses, a parameter which differentiates well at lower proficiency levels but fluctuates according to text complexity involved) and rate of articulation (the total phonation time minus pause time). Since both of these require

instrumentation for their analysis, however, their use is restricted. In addition, there are certain wellformedness phenomena such as stalls, repair, and parenthetical remarks. Of such hesitatory devices, stalls include silent pauses (> 125 msec; shorter ones may be due to length of phonation and hence multiply determined); filled pauses (such as uh, ah, hm, and like fillers); progressive repeats (to accommodate lexical search, for instance, as in to the...to the city); and drawls, forms of phonetic lengthening to buy time (as in Let's sayyy...tomorrow at five?). Repairs include false starts (I was--I have been there since noon) and bridging repeats (where repeated elements begin with the first part of the entire constituent to reestablish temporal and semantic cohesion, as in the /pause/ the father). Parenthetical remarks perform numerous cohesive functions and are of the type well; you know; in other words.

Repair would be expected to play a larger role in nonnative (NN) than in native (N) speech, but for the intermediate competence levels under investigation, experimental results indicate that it is stalls which consistently account for a full 90% of all interruptions, whether in N or NN speech, while repairs make up less than 10%, even in NN speech (Hieke 1981). Contrary to prevailing opinion, speakers avail themselves of such devices in L1 and L2 alike, and since they show only slight crosslinguistic variation, this universal repertoire of wellformedness phenomena need not be taught or tested. The most significant and practical measure of oral proficiency is therefore speech rate. Obviously, it is a rather superficial means of evaluating speech and cannot serve as the sole indicator of fluency but must be

supplemented by other, more qualitative parameters.

4. Qualitative Parameters of Fluency

The spectrum of qualitative parameters is extremely broad and relatively uncharted. It includes syntacto-semantic and pragmatic features in addition to the phonetic ones described in the following. Here a speech-dynamic view is imperative since one's efforts to chart the sound stream with conventional means will fall short of even observational adequacy. If we consider the speech signal in its nondiscrete form, aside from the ever-present pause frames of structural or hesitational origin which envelope utterances (and accommodate breathing), the sound stream is interrupted only very briefly. Breaks in intonation, as graphic displays of pitch contours (a straightforward indicator of continuity) and a corresponding segmental analysis can reveal, are ascribable in full to voiceless segments (here including glottal stop, aspiration, nonrelease). In fact,

At a conservative estimate, less than 40% of all word boundaries are marked by some physical event, and most of these coincide with a constituent boundary. The impression that words in fluent speech are separated in time is an illusion (Cole and Jakimik 1980:138).

The derivation of dynamic speech from citation form sets off a range of processes of absorption whose effect varies in relation to factors such as type of delivery. Here it suffices to recognize just two ways of delivering speech (but cf. Rudes 1976 for four speech tempos), casual and deliberate. Casual speech re-

fers to the normal, everyday use of language and is of primary interest in the following; the term should not be understood to imply colloquial to the extent of being substandard. Deliberate speech--considered the marked member--refers to the careful, even measured speech reserved for formal occasions such as official speeches, lectures, sermons, recitations. At the phonetic syllabic level, casual speech typically includes absorption at both intra- and interword positions. Absorption occurs in gradations and thus affects in growing increments forms of linking, levelling, and loss. Various of its aspects have been covered and numerous rules described in the literature (cf., among others, Arnold and Hansen 1979; Brown 1981; Heffner 1950; Selkirk 1981; also the ASR work by Cohen and Mercer 1975; Klatt 1980a/b; Oshika et. al. 1975; Shoup 1980; as well as occasional texts: Meyer 1965; Mortimer 1980). The classification presented below draws on all of these sources but makes no implications about any internal hierarchy in its arrangement.

Linking (liaison) occurs essentially where final consonants become attached to the following syllable if that begins with a vowel. The overriding rationale for linking obviously lies in the avoidance of hiatus wherever possible. Since initial vowels are preceded by glottal onset, such a pitch-interruptive feature becomes a prime subject for absorption. To make the vowel noninitial, syllabic restructuring (resyllabication) therefore takes place in casual speech. In general, syllable-initial vowels--and hence glottal onset--predominate only under restricted conditions: in deliberate speech; where specially stressed (it was the only way; he is absolutely wrong); where plus juncture is obligatory;

after silence (with no prior syllable to draw on). At least four types of linking can be distinguished:

4.1 Consonant Attraction:

Word-final consonants become linked to the following syllable if that begins with a vowel. Rudes (1976:128) and others speak of "resyllabification toward stronger stress", but this is not a precondition.

- (1) an apple /ə.næ.pəl /; far and away /fɑ.ɾən.də.weɪ/;
out of an old opera /aʊ.də.və.hold.ə.pɾə/; sort of /sɔɾ.dəv /.

The last two examples show that restructuring can lead to secondary absorption processes based on the newly created environment, such as in the last syllable in opera (exemplifying loss) and the flapping in sort of (levelling). Phonotactic evidence supports the existence of C-attraction, e.g., he sees to it, with an unaspirated /t/ typical for a cluster beginning with /s/, i.e. /hi.sɪy.stu.wɪt /; also seal island, with a clear /l/ typical for prevocalic position, i.e. /sɪy.laɪ.lənd/. In the first example, superficially there is an initial /t/, in the second superficially a postvocalic /l/: that these expectations are not met is due to restructuring (cf. Pulgram 1970:51).

Numerous phenomena show linking to be at work, for instance the nonmorphological cut of the base morpheme form after affixation: /ɪn.fɔɾ.meɪ.ʃən /; cf. also publish-er: /pə.blɪ.ʃɔɾ /; with additional palatalization critic-ism: /kɾɪ.tɪ.sɪ.zəm/, deriv-ation: /dɪ.rɪ.vɪy.ʃən /; further, the appearance of unarticulated consonants in bases after suffixation, sign-al: /sɪg.nəl /; paradigm-atic: /pə.rɪ.dɪg.mə.tɪk/; bomb-ard: /bɔm.bəɾd/.

4.2 Glide Attraction:

Word-final vowels having offglides (i.e. high and mid vowels) become linked to the following syllable by their offglide if that syllable begins with a vowel.

- (2) now I /nəʊ.waɪ /; high up /haɪ.ʏəp /; the apple /ði.ʏə.pəl/,
so on /so.wən /; story is /sto.ri.ʏɪz /;

After vowel deletion, an instance of loss, the last example becomes /sto.ri.ʏz /. Hence glide attraction can have secondary consequences in the form of increasingly more severe absorption, as the examples in (3) show.

(3) the eternal:

a) /ði.ʔɪ.tə.nəl/

b) /ði.ʏɪ.tə.nəl/

c) /ði.ʔɪ.tə.nəl/

to arrest:

a) /tu.w.ʔə.ɹɛst /

b) /tu.wə.ɹɛst /

c) /twə.ɹɛst /

Where unstressed vowels are absorbed entirely and with them the nucleus, the entire syllable is lost (note that the perception of the hiatus is due to the silent state portion of the glottal stop).

4.3 Stop Attraction:

The avoidance of hiatus extends to consonants if followed by continuants, with the aspiration that is part of the stop release portion remaining unreleased until phonation of the following continuant.

- (4) what she /wə.tʰɪ /; about the /ə.bəʊ.tʰə /; seized her /si.ʔɪz.dʰər/ (where [ʰ] = nonrelease).

Release attraction would be an equally accurate term to describe this process.

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4.4 Ambisyllabicity

Where a consonant cannot clearly be ascribed to either syllable, both syllables are affected and share it.

(5) goner /gənər /.

This affects not only continuants but unexpectedly also stops (Kahn 1980), although stops have no duration to link syllables as such. In this case the release portion is delayed, giving the impression of stops stretched in the manner of continuants.

(6) bedding /bed'dɪŋ / > /bɛdɪŋ /.

Ambisyllabicity may occur as a secondary process after /h/ deletion or after degemination.

(7) eating his /iɪ.dɪŋ.hɪz / > /iɪ.dɪŋɪz/; keenness
/kiɪn.nɛs / > /kiɪnɛs /; unknown /ən.nəʊn / > /ənəʊn /.

Space limitations prevent a listing of the two other classes of absorption, levelling and loss (cf. below for a partial list), but a more comprehensive account of these processes including data on crosslinguistic comparisons is in progress (Hieke, in prep.). Here it must suffice to point out that linking has two consequences at the level of casual speech: it radically affects canonical shape in that virtually all vowel-initial syllables are eliminated, and it is a pervasive phenomenon in English and may thus serve as a significant parameter of both N and NN speech.

5. N and NN Speech Data on Consonant Attraction

To test the hypothesis that even relatively accomplished NN speakers tend to betray their NN status by availing themselves of such qualitative phenomena as linking less often than N speak-

ers, a number of small-scale experiments were conducted in connection with consonant attraction. Its assessment is relatively uncomplicated and hence a good candidate for serving as a representative parameter within the limits of classroom testing. The effects of absorption for experimental purposes, however, should be studied with maximal precision, and instrumentation now on the market makes possible a two-dimensional analysis. This consists of a graphic display on the one hand, and on the other of an extensively reduced and perceptually restored aural record.¹

¹For present purposes, samples of spontaneous speech (N = 41) were collected according to the paraphrase mode and subjected to such a visaural analysis. The visual display occurs in form of acoustic energy in terms of amplitude over time (by means of an F-J Electronics FFM 650 and a Siemens Oscillomink L Level Recorder). The aural record exists in form of a taped acoustic record which was subjected to a rate reduction of up to 17% of the original and then restored to natural frequencies (by means of a Lexicon Varispeech 26 and Revox B 77 Variable Speed Control, as well as B 77 MK II Stereo Tape Recorders and a B 750 MK II Integrated Stereo Amplifier). The resulting stretched version of the aural signal reveals subtle phonetic and prosodic phenomena in clear distinction.

Since linking is not an obligatory occurrence in any speech mode, however, it has usually been formulated as an inexact tendency (or variable rule). The experiments were therefore designed

to provide information not only on the prevalence of consonant attraction but to shed light on the strength of it as a tendency. The results are summarized in the Table (on p. 18) and show that consonant attraction in casual English is present at the rate of about 12 links per hundred syllables, not counting any other form of linking. To determine its status as a variable rule, all potential link points were charted in addition and then compared to actual links. In this instance, the results show that almost 4/5 of all potential link points (15.6/100 syll) also serve as actual links (12.11/100 syll). This surprisingly high average of merely one subtype of linking marks consonant attraction as a major feature of absorption and one fundamental parameter of casual speech. It should be noted that the several related processes which are as yet uncharted, not to speak of the variety of types demonstrating levelling and loss, have not even been considered in this count. They are assumed to be--at least in part--similarly well represented and should further strengthen the status of absorption (just as the reverse process of absorption, restoration, is expected to typify input processes and listening comprehension). Furthermore, the high incidence discovered for one parameter seriously puts its status as a mere tendency into question; it may be advisable to consider linking a regular rule of English which permits some exceptions.

The Table also shows that a comparison of N with NN data gathered under identical conditions does indeed indicate significant crosslinguistic differences at intermediate levels of proficiency ($p < .0005$). While almost 80% of potential link points

Table

Average measures of consonant attraction in English native (N) versus nonnative (NN) speech per 100 syllables, with percentages of potential link points capitalized on in actual speech (N: S = 12, 2166 syll; NN: S = 29, 4081 syll).

		<u>N</u>		<u>NN</u>
ACTUAL LINKS/ 100 syll	<u>M</u>	12.11	<u>M</u>	6.88
	SD	4.22	SD	3.14
POTENTIAL LINKS/100 syll	<u>M</u>	15.60	<u>M</u>	12.86
ACTUALIZED LINK POTEN- TIALS/100 syll		77.63%		53.50%

$t = 4.38$; $df = 39$; $p < .0005$

become actual links in N speech, as shown above, in NN English only 54% (6.88/100 syll of 12.86/100 syll) were actually used as links. With consonant attraction significantly lower in NN speech, this parameter can serve to differentiate reliably between N and NN English.

6. Restoration

Although a listing of levelling and loss, the other types of absorption, would be too voluminous here, at least brief mention should be made of restoration, the reverse process and thus the crucial indicator of how listening can be accounted for. Speakers are also listeners, after all, and the gap between dynamic speech and citation form, and with it the nature and task facing NN speakers in bridging this gulf, can be demonstrated equally well from this direction. In addition, even a short list adds a glimpse of the types of processes captured under levelling and loss and reinforces our appreciation of how powerful these phenomena actually are.

The stress-and-pause-timed chain of nondiscrete sound serves the listener as raw input. From the sound stream citation forms must be isolated to make eventual interpretation feasible. Foremost among restorative processes must therefore be syllabication (in contrast to syllabic restructuring) in form of types of de-linking, syllabic expansion (vs. contraction) to restore syllables to citation form. From that, regular strings of words with their hiatus are derived, so that now ambiguities are resolved, offglides

restored to their respective vowels, and lexical accessing can take place. Also operative are regemination and isoarticulation (vs. coarticulation), vowel decentralization, place and voice dissimilation (vs. approximations of various sorts) in the form of deflapping, depalatalization, /ʔ/ and /h/ insertion, homorganic stop release, and consonant cluster expansion.

7. Conclusion

The speech-dynamic approach used here provides clear evidence of how the necessary fluidity of connected speech is achieved and now this orientation facilitates the study of the manifold processes which in effect make language user-friendly. Conversely, it also lays bare the host of complications a speaker faces, it characterizes what in nonpathological speech causes speech production to become impeded, and it helps crystallize those conditions under which absorption may take place. An understanding and an appreciation of the range of features which NN speakers must come to master has obvious pedagogical ramifications. What typifies such speech, what obstacles must be overcome, and what the overall distance in kind and degree between NN and N speech at any stage remains is what was holistically referred to as foreign accent in the past.

As the experimental results presented here show in exploratory fashion, a predominantly holistic approach to fluency as a concept and learning objective can give way to more promising approaches which can differentiate among parameters of fluency. The prevalence of such parameters is greater than might have been thought, and greater certainty about discrete fluency pheno-

mena may prove to be very useful for several aspects of second language learning.

It is inevitable that with a topic as multidimensional as fluency, at least some of the features sensitive to the actual flow of speech and to the information flow in language receive insufficient attention. It should be stated at least in passing at this point that there is now increasing evidence to show that the more performative aspects of language can in fact be taught and learned at a point before overall L2 competence has been solidly established, for instance in the area of prosody (cf. Neufeld and Schneiderman 1980). The fundamental nature of such skills--just as of fluency--is being recognized and finds reflection in teaching techniques and second language programs (for ESL/EFL, cf. Dunbar and Hieke. Hieke and Dunbar 1984). Thus there is recent experimental evidence to confirm that "there is a positive value in active mimicry" (Gilbert 1980:116). With imitation gaining renewed respectability, aural/oral aspects of programs are bound to receive even greater attention in the future. Ways are being developed to bring learners into more immediate proximity with the target language, even in institutional and group-centered settings. Parallel with a demand for innovative techniques will be the urgent need to come to terms with the realities of fluent speech itself.

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